

- c. introducing a plurality of random DNA sequences into a population of cloning vectors to obtain a plurality of cloning vectors containing random DNA sequences;
- d. introducing said cloning vectors into suitable host cells;
- e. expressing said cloning vectors in said host cells; and
- f. screening said host cells using said means for detecting the desired biological activity under conditions which allow detection of one or more host cells comprising vectors which comprise a functional DNA sequence which provides the desired biological activity.

4. A method of isolating a functional DNA sequence which provides a desired biological activity comprising:

- a. providing a means for detecting said desired biological activity;
- b. synthesizing a mixed population of random DNA sequences;
- c. introducing a plurality of random DNA sequences into a population of cloning vectors to obtain a plurality of cloning vectors containing random DNA sequences;
- d. introducing said cloning vectors into suitable host cells;
- e. expressing said cloning vectors in said host cells;
- f. screening said host cells using said means for detecting the desired biological activity under conditions which allow detection of one or more host cells comprising vectors which comprise a functional DNA sequence which provides the desired biological activity; and
- g. isolating said polynucleotide sequence or sequences which provide the

desired biological activity.

5. A purified, mixed population of randomly generated DNA sequences which comprise a functional DNA sequence which provides a desired biological activity.

6. A method of isolating host cells which comprises a functional DNA sequence which produces a desired biological activity comprising:

- a. providing a means for detecting said desired biological activity;
- b. synthesizing a mixed population of random oligonucleotides;
- c. introducing a plurality of random oligonucleotides into a population of cloning vectors to obtain a plurality of cloning vectors containing random oligonucleotides;
- d. introducing said cloning vectors into suitable host cells;
- e. expressing said cloning vectors in said host cells;
- f. screening said host cells to determine whether the inserted oligonucleotide provides the desired biological activity;
- g. isolating said host cells having said oligonucleotide having the desired biological activity.

7. A method of producing a mixed population of random DNA sequences in order to identify one or more functional sequences which provide a desired biological activity

comprising:

- a. synthesizing a mixed population of random DNA sequences in a manner by which the frequency of stop codons in said mixed population is reduced; and
- b. inserting said mixed population of random DNA sequences into a population of cloning vectors to form a mixed population of vectors containing randomly generated DNA sequences.

8. An isolated, mixed population of vectors comprising randomly generated DNA sequences encoding a mixed population of amino acid sequences and having a reduced frequency of stop codons as compared to codons encoding other amino acids.

9. An isolated, mixed population of DNA sequences comprising an oligonucleotide providing for a desired biological activity, said DNA sequences being of about several hundred nucleotides or less in length.

10. An isolated, mixed population of vectors comprising a mixed population of DNA sequences comprising an oligonucleotide providing for a desired biological activity, said DNA sequences being of about several hundred nucleotides nucleotides or less in length.

11. An isolated, mixed population of random DNA sequences comprising a

DNA sequence providing a desired biological activity produced by a method comprising synthesizing a mixed population of random DNA sequences in a manner which results in stop codon bias, and introducing a plurality of said randomly generated DNA sequences into a population of cloning vectors to form a mixed population of vectors containing randomly generated DNA sequences.

12. A method of identifying a functional DNA sequence which provides a desired biological activity comprising:

- a. providing a means for detecting said desired biological activity;
- b. synthesizing a mixed population of random DNA sequences in a manner by which the frequency of stop codons in said mixed population is reduced;
- c. introducing a plurality of random DNA sequences into a population of cloning vectors to obtain a plurality of cloning vectors containing random DNA sequences;
- d. introducing said cloning vectors into suitable host cells;
- e. expressing said cloning vectors in said host cells; and
- f. screening said host cells using said means for detecting the desired biological activity under conditions which allow detection of one or more host cells comprising vectors which comprise a functional DNA sequence which provides the desired biological activity.

13. A method of identifying a peptide, polypeptide or protein having a desired

biological activity comprising:

- a. providing a means for detecting said desired biological activity;
- b. synthesizing a mixed population of random DNA sequences;
- c. introducing a plurality of random DNA sequences into a population of cloning vectors to obtain a plurality of cloning vectors containing random DNA sequences;
- d. introducing said cloning vectors into suitable host cells;
- e. expressing said cloning vectors in said host cells to produce a random population of peptides, polypeptides or proteins; and
- f. screening said random population of peptides, polypeptides or proteins with said means for detecting the desired biological activity under conditions which allow detection of one or more random population of peptides, polypeptides or proteins having the desired biological activity.

14. A method of identifying a peptide, polypeptide or protein capable of binding a preselected antigen:

- a. providing an antigen;
- b. synthesizing a mixed population of random DNA sequences;
- c. introducing a plurality of random DNA sequences into a population of cloning vectors to obtain a plurality of cloning vectors containing random DNA sequences;
- d. introducing said cloning vectors into suitable host cells;